



PHI-CON

45 W AC-DC Converter PAC45F-Series

- Enclosed plastic case
- 85 ... 264 V_{AC}, 100 ... 370 V_{DC} universal input range
- Continuously short circuit protected
- Over voltage protected
- Safety EN 62368-1
- Safety class II



Model guide

Type	Output voltage [V _{DC}]	Output current [A] max.	Output power [W] max.	Efficiency typ. @ full load [%]	Capacitive load max. [μF]
PAC45F05S	5.0	8	40	81	30000
PAC45F12S	12	3.8	45	84	6400
PAC45F15S	15	3	45	85	5600
PAC45F24S	24	1.9	45	86	2000
PAC45F48S	48	0.94	45	87	600

Specifications

Input	
Voltage range	85..264 V _{AC} or 100..370 V _{DC}
Line frequency range	47...63 Hz
Full load input current	≤ 1.5 A @ 115 V _{AC} ≤ 0.75 A @ 230 V _{AC}
Stand-by power consumption	≤ 0.5 W @ 230 V _{AC}
Inrush current	50 A, typ. @ 115 V _{AC} 70 A, typ. @ 230 V _{AC}
Recommended fuse	3.15 A / 250 V~, time delayed type
Hold up time @ full load	≥ 8 ms @ 115 V _{AC} . ≥ 50 ms @ 230 V _{AC} .
Isolation	
Isolation voltage, input to output leakage current < 5 mA	4000 V _{AC} for 1 min.
Output	
Output voltage tolerance	±2 %
Line regulation at full load	± 0.5 %, typ.
Load regulation	± 1 %, typ. @ 0..100 % load
Temperature coefficient	± 0.02 % / °C
Ripple & noise @ BW 20 MHz	120 mVp-p, max. (see figure1)
Output over voltage protection	
PAC45F05S	≤ 9 V _{DC} , TVS diode clamping
PAC45F12S	≤ 16 V _{DC} , TVS diode clamping
PAC45F15S	≤ 24 V _{DC} , TVS diode clamping
PAC45F24S	≤ 35 V _{DC} , TVS diode clamping
PAC45F48S	≤ 56 V _{DC} , TVS diode clamping
Minimum load	Not required
Protection	
Short circuit	Continuous, hiccup, auto restart
Over current	≥ 110 % of rated current

General		
Safety standard	EN -, IEC -, UL 62368-1	
Safety class	Class II	
Switching frequency	100 kHz, typ.	
Reliability MTBF MIL-HDBK-217F@25°C	> 300000 h	
EMC		
CE	EN 55032, CISPR 32	Class B
RE	EN 55032, CISPR 32	Class B
ESD	EN -, IEC 61000-4-2	Air ±8 kV, Contact ± 6 kV, perf. Crit. B
RS	EN -, IEC 61000-4-3	10 V/m perf. Crit. A
EFT	EN -, IEC 61000-4-4	± 4 kV, perf. Crit. B
Surge	EN -, IEC 61000-4-5	Line to line ± 1 kV perf. Crit. B (see figure 2)
		Line to line ± 2 kV, perf. Crit. B, Line to ground ± 4 kV, perf. Crit. B (see figure 3)
CS	EN -, IEC 61000-4-6	10 Vrms perf. Crit. A
Voltage dips, short interruptions and voltage variations EN -, IEC 61000-4-11	0 %, 70 % perf. Crit. B	
Environmental		
Operating ambient temperature	-40 ... 70 °C with derating	
Storage temperature	-40 ... 85 °C	
Power derating	See diagrams	
Storage humidity	95 %, non condensing	
Cooling	Free air convection, ≥ 35 LFM	
Physical		
	Dimensions [mm]	Weight [g]
PAC45FxxS	87.0 x 52 x 29.5	205
PAC45FxxSA2	135 x 70 x 37.9	290
PAC45FxxSA4	137 x 70 x 42.4	360
Case material	Black plastic, UL94V-0 rated	
Wave soldering temperature	≤265°C, ≤10s, ≥1.5 mm from case	
Manual soldering temperature	≤370°C, ≤5s, ≥1.5 mm from case	

Part number information										
PHI-CON	AC/DC-Converter	Output Power		Series	Output voltage		Output		Mountable on	
P	AC	45	45 W	F	05	5 V	S	single	blanc	PCB
					12	12 V			A2	Chassis
					15	15 V			A4	DIN Rail
					24	24 V				
					48	48 V				
Example:	PAC45F12S	PHI-CON AC/DC Converter, Pout 45 W, Vout 12 V, single Output								

Note:

1. Unless otherwise specified are all values specified at Ta 25 °C, humidity < 75 % and rated output load current.
2. The outputs of the AC/DC converters are not suitable for parallel operation.

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Figure 1 Output ripple & noise measure method BW 20 MHz

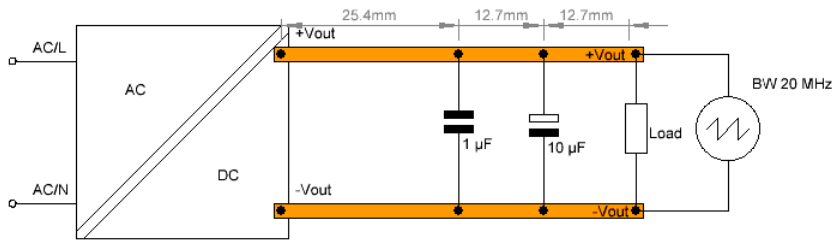


Figure 2 Typical application circuit

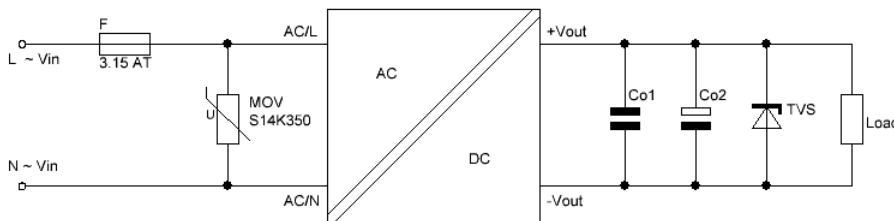


Figure 3 Application circuit for higher EMC performance

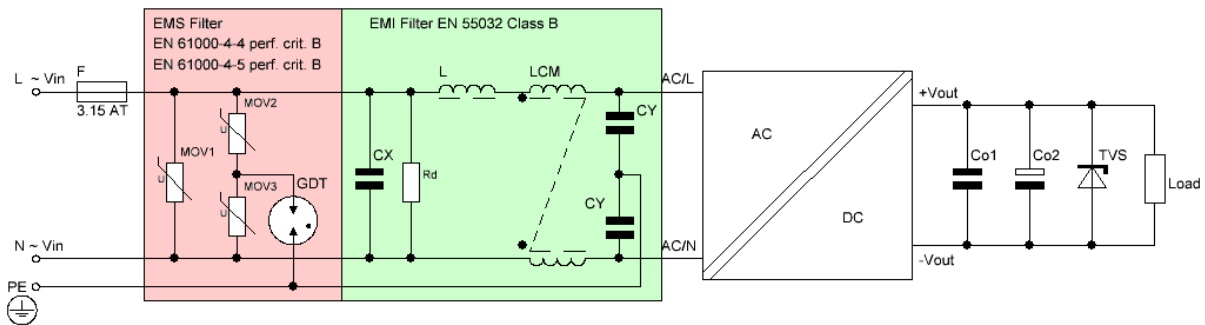
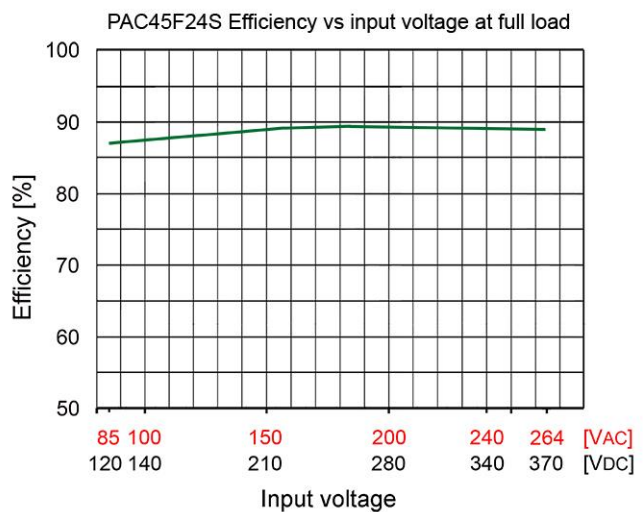
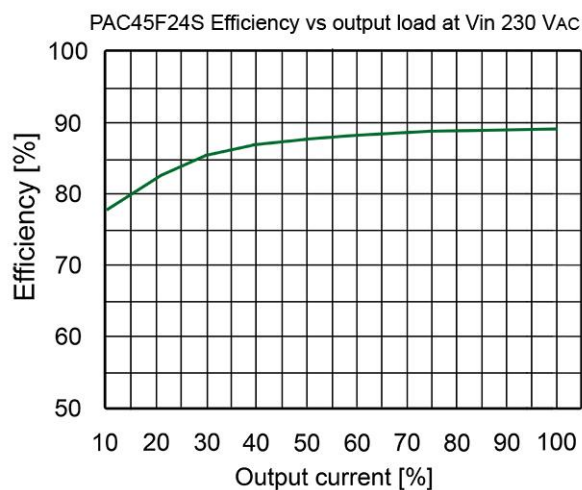
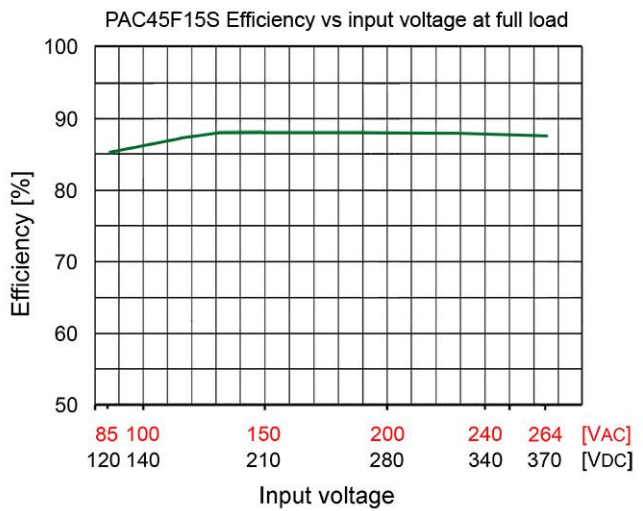
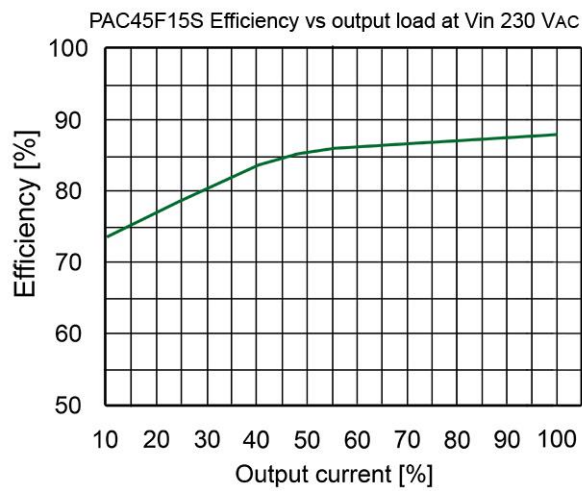
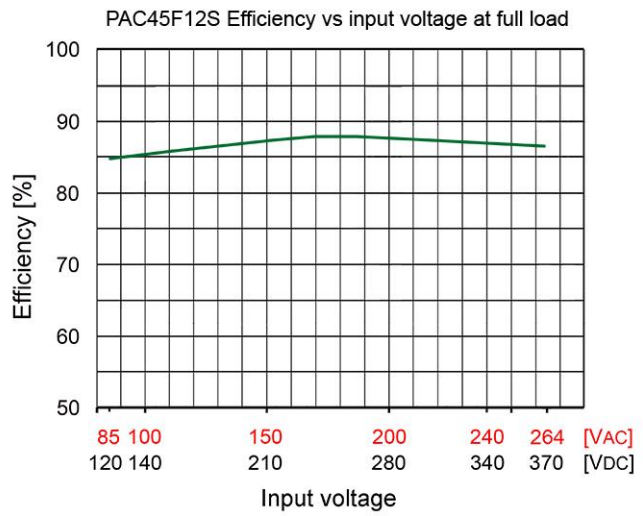
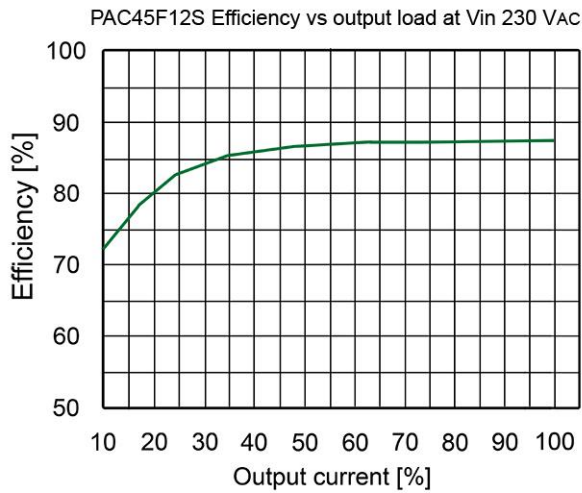


Table for typical circuits Figure 2 and Figure 3												
Type	F Time delayed type, 250 V~	MOV1	MOV2, MOV3	GDT	CX 275 V~	Rd 2 W	L	LCM	CY 400 V~	Co1 MLCC	Co2	TVS
PAC45F03S	See circuit	S20K300	S10K300	EM3600XS	0.22 µF	1 MΩ	4.7 µH	2 mH	1 nF	1 µF	220 µF, ≥ 10 V	SMBJ7.0A
PAC45F05S	See circuit	S20K300	S10K300	EM3600XS	0.22 µF	1 MΩ	4.7 µH	2 mH	1 nF	1 µF	220 µF, ≥ 10 V	SMBJ7.0A
PAC45F09S	See circuit	S20K300	S10K300	EM3600XS	0.22 µF	1 MΩ	4.7 µH	2 mH	1 nF	1 µF	120 µF, ≥ 25 V	SMBJ12A
PAC45F12S	See circuit	S20K300	S10K300	EM3600XS	0.22 µF	1 MΩ	4.7 µH	2 mH	1 nF	1 µF	120 µF, ≥ 25 V	SMBJ20A
PAC45F15S	See circuit	S20K300	S10K300	EM3600XS	0.22 µF	1 MΩ	4.7 µH	2 mH	1 nF	1 µF	120 µF, ≥ 25 V	SMBJ20A
PAC45F24S	See circuit	S20K300	S10K300	EM3600XS	0.22 µF	1 MΩ	4.7 µH	2 mH	1 nF	1 µF	68 µF, ≥ 35 V	SMBJ30A



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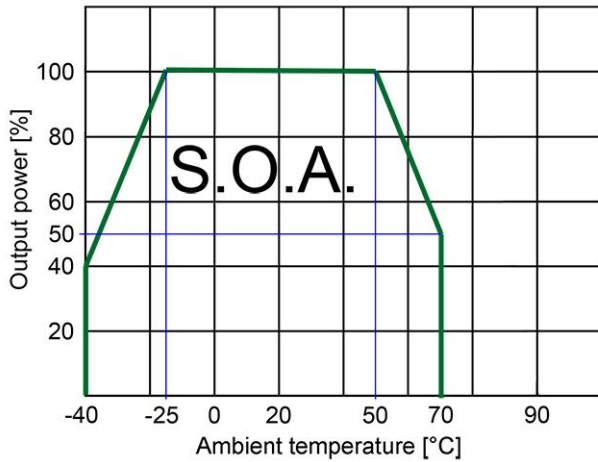




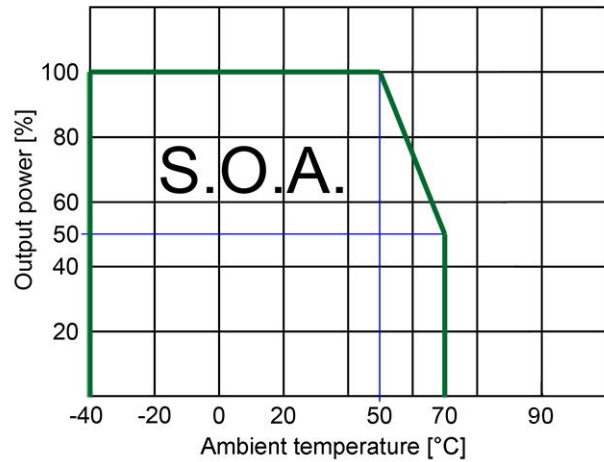
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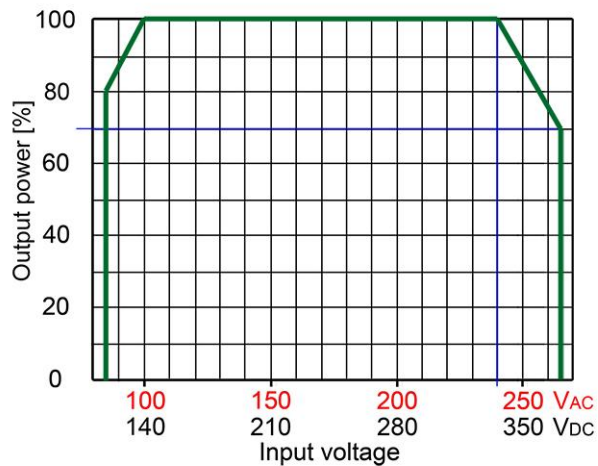
Power derating vs ambient temperature
at V_{in} 85..220 V_{AC}



Power derating vs ambient temperature
at V_{in} 220..264V_{AC}

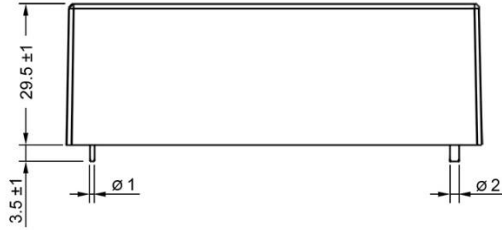


Power derating vs input voltage
at T_a -40...-25°C

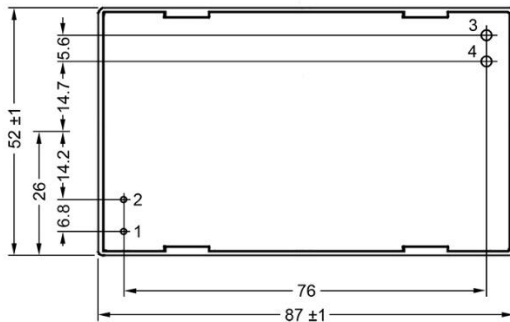


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Mechanical dimensions PCB mountable version

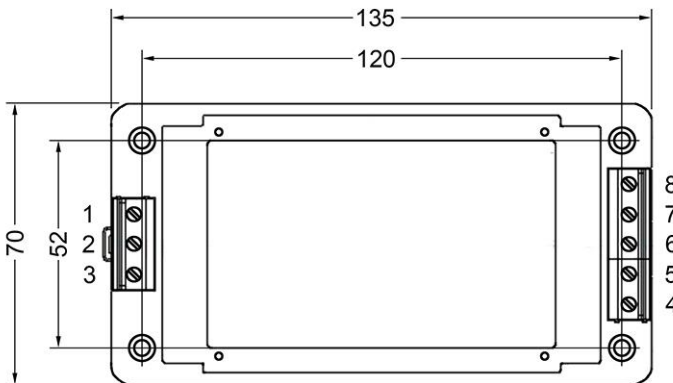


Note
 Unit: mm
 Pin diameter tolerances: ± 0.1 mm
 General tolerances: ± 0.5 mm
 Recommended drill hole diameter for Pin 1 & 2: 1.5 mm
 Recommended drill hole diameter for Pin 3 & 4: 2.5 mm

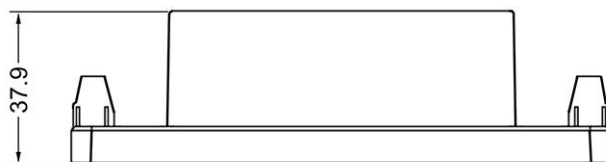


Pin assignment	
1	AC In (L)
2	AC In (N)
3	+ Vout
4	- Vout

Mechanical dimensions chassis mountable version (Suffix: A2)



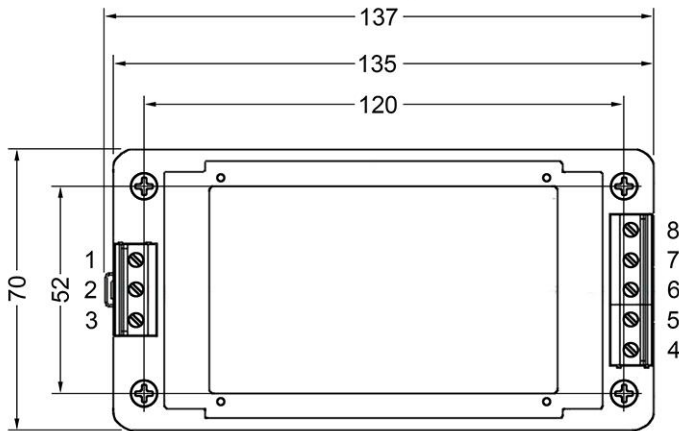
Terminal assignment	
1	AC In (L)
2	N.C.
3	AC In (N)
4	+ Vout
5	- Vout
6	N.C.
7	N.C.
8	N.C.



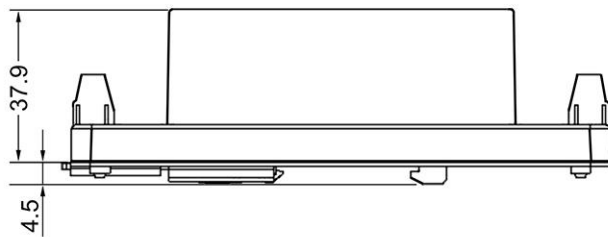
Note
 Unit: mm
 General tolerances: ± 1 mm
 Wire range: 12...24 AWG
 Tightening torque: < 0.4 Nm

45 W AC-DC Converter PAC45F-Series

Mechanical dimensions DIN Rail mountable version (Suffix: A4)



Terminal assignment	
1	AC In (L)
2	N.C.
3	AC In (N)
4	+ Vout
5	- Vout
6	N.C.
7	N.C.
8	N.C.



Note
 Unit: mm
 General tolerances: ± 1 mm
 Wire range: 12...24 AWG
 Tightening torque: < 0.4 Nm
 Mountable on DIN Rail TS35
 The DIN-Rail must be connected with protection earth!

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